

**What is claimed is:**

1. A driving device for display period control of organic light emitting diode (OLED), which can control the grayscale of said OLED of every scan period connected to  
5 said driving device, comprising:
  - a current buffer, connected to an external current source that provides constant current;
  - a switching unit, connected to an external precharge voltage source, said current buffer and a GNDA, said  
10 switching unit also includes an output which is connected to the OLED; and
  - a pulse width modulation (PWM) grayscale control unit, connected to an external memory and said switching unit for controlling said grayscale display according to  
15 image data transmitted by said memory after receiving a start signal in said scan period, which uses the steps of;  
connecting said precharge voltage source and said OLED during a first duration;
  - converting said grayscale of said image data to a  
20 grayscale display duration to control said switching unit for connecting said current buffer and said OLED;
  - controlling said switching unit for connecting said OLED and said GNDA until a second duration is due when said grayscale display duration is due;
  - 25 controlling said switching unit for connecting said

OLED and said GNDA until a third duration is due when said second duration is due;

wherein said display period is sum of said first, said second and said third durations.

5 2. The driving device for display period control of organic light emitting diode (OLED) according to claim 1, wherein said grayscale is more than 2 bits.

3. The driving device for display period control of organic light emitting diode (OLED) according to claim 1,  
10 wherein the conversion of said grayscale display duration is based on said grayscale for proportional of said second duration, for example, when said grayscale is 2 bits, said grayscale display duration is 0, 1/3, 2/3 and 1-time of said second duration; when said grayscale is 2 bits, said  
15 grayscale display duration is 1, 1/7, 2/7 and 1-time of said second duration, and so on.

4. The driving device for display period control of organic light emitting diode (OLED) according to claim 1, wherein said first duration is set according to panel types of  
20 said OLED.

5. A method for display period control of organic light emitting diode (OLED) for a grayscale display, where a display period including precharge, display and discharge phases is set beforehand, comprising the steps of:

25 receiving image data;

calculating grayscale display duration according to said image data;

precharging said OLED within the precharge phase;

supplying a constant current continuously to aid OLED

5 for said grayscale display until grayscale display duration is due;

discharging said OLED until said display phase is due;

and

discharging said OLED until said discharge phase is  
10 due.

6. The method for display period control of organic light emitting diode (OLED) according to claim 5, wherein said grayscale is more than 2 bits.

7. The method for display period control of organic light  
15 emitting diode (OLED) according to claim 5, wherein the calculation of said grayscale display duration is based on said grayscale for proportional of said display phase, for example, when said grayscale is 2 bits, said grayscale display duration is 0, 1/3, 2/3 and 1-time of said display  
20 phase; when said grayscale is 3 bits, said grayscale display duration is 1, 1/7, 2/7 and 1-time of said display phase, and so on.

8. The method for display period control of organic light emitting diode (OLED) according to claim 5, wherein said  
25 precharge phase is set according to panel types of said

OLED.

9. A driving architecture for display period control of organic light emitting diode (OLED), which is to control grayscale of said OLED in every column or row scanned in the display matrix formed by several said OLEDs, said driving architecture is formed by a plurality of driving devices equivalent to the number of said OLEDs in the scanned column or row, each of said driving device comprising:
- 10 a current buffer, connected to a external current source that provides constant current;
  - a switching unit, connected to a external precharge voltage source, said current buffer and a GNDA, said switching unit also includes an output which is connected
  - 15 to the OLED; and
  - a pulse width modulation (PWM) grayscale control unit, connected to a external memory and said switching unit for controlling said grayscale display according to image data transmitted by said memory after receiving a
  - 20 start signal in said scan period, which uses the steps of;
    - connecting said precharge voltage source and said OLED during a first duration;
    - converting said grayscale of said image data to a grayscale display duration to control said switching unit for
    - 25 connecting said current buffer and said OLED;

controlling said switching unit for connecting said OLED and said GNDA until a second duration is due when said grayscale display duration is due; and

controlling said switching unit for connecting said  
5 OLED and said GNDA until a third duration is due when said second duration is due;

wherein said display period is sum of said first, said second and said third durations.

10. The driving architecture for display period control of  
10 organic light emitting diode (OLED) according to claim 9, wherein said grayscale is more than 2 bits.

11. The driving architecture for display period control of organic light emitting diode (OLED) according to claim 9, wherein the conversion of said grayscale display duration  
15 is based on said grayscale for proportional of said second duration, for example, when said grayscale is 2 bits, said grayscale display duration is 0,  $1/3$ ,  $2/3$  and 1-time of said second duration; when said grayscale is 2 bits, said grayscale display duration is 1,  $1/7$ ,  $2/7$  and 1-time of said  
20 second duration, and so on.

12. The driving architecture for display period control of organic light emitting diode (OLED) according to claim 9, wherein said first duration is set according to panel types of said OLED.

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